UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,184	07/01/2005	Akihiko Namba	039.0050	4938

29453 7590 06/11/2007

JUDGE & MURAKAMI IP ASSOCIATES
DOJIMIA BUILDING, 7TH FLOOR
6-8 NISHITEMMA 2-CHOME, KITA-KU
OSAKA-SHI, 530-0047
JAPAN

EXAMINER	
SINGAL, ANKUSH K	
ART UNIT	**PAPER NUMBER**
2823	

MAIL DATE	DELIVERY MODE
06/11/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,184	NAMBA ET AL.	
	Examiner	Art Unit	
	Ankush k. Singal	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/04/2007,07/01/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re. claims 1 and 2, the applicant discloses "...10 ppm or more N...". The term "...10 ppm or more..." makes it indefinite , as by how much the concentration of nitrogen is more.

Re. claim 3, the applicant discloses "...Li and N sum-total dose is 5.0.times.10.sup.15 cm .sup.-2 or less..." and "...10 ppm or more N...". The term 10 ppm or more makes it indefinite , as by how the concentration of nitrogen is more and term total dose is 5.0.times.10.sup.15 cm .sup.-2 or less makes it indefinite as by how much the total dose is less. Claim 4 is dependent on claim 3.

Re. claim 6, the applicant discloses "...sheet resistance is of 0.sup.7 .OMEGA./.quadrature. or less..." The term "...sheet resistance is of 0.sup.7 .OMEGA./.quadrature. or less..." makes it indefinite, as by how much the sheets resistance is less.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over A.M.Zaitsev(Optical properties of Diamond- A data Handbook 2001) .

Re. claim 1, Zaitsev discloses a method of manufacturing n-type semiconductor diamond, comprising: a step of producing diamond incorporating Li and N by implanting Li ions and a step of annealing said diamond incorporating Li and N(Page 265).

However Zaitsev does not teach the Lithium and Nitrogen ions to be 10ppm and annealing temperature to be between 800.degree. C. to less than 1800.degree. C, but Zaitsev also discloses that the annealing behavior depends on the type of diamond and irradiation conditions(Page 265). However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ

to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 2, Zaitsev discloses a method of manufacturing n-type semiconductor diamond, comprising: a step of producing diamond incorporating Li and N by implanting into single-crystal diamond essentially not containing impurities Li and N ions and the annealing step of diamond incorporating Li and N.

However, Zaitsev does not teach that the ion-implantation depths at which the post-implantation Li and N concentrations each are 10 ppm or more will overlap; and a step of annealing at a temperature in range of from 800.degree. C. to less than 1800.degree. C. However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ

to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 3, Zaitsev discloses all the limitations including implantation of Li and N in diamond and then annealing but does not teach a step of implanting the ions so that ion-implantation depths at which the post-implantation Li and N concentrations each are 10 ppm or more will overlap, and so that the Li and N sum-total dose is 5.0.times.10.sup.15 cm .sup.-2 or less. However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 4 as discussed above in claim 3, Zaitsev discloses all the limitations as discussed above in claim 1 except ion-implantation apparatus having an electron-beam line and two ion-beam lines is utilized to implant the Li and N ions simultaneously while radiating with the electron beam the single-crystal diamond that is ion-implanted , but Zaistev also teaches that the implantation apparatus depends on the type of e diamond used . However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 5, Zaistev discloses a method of manufacturing n-type semiconductor diamond wherein an annealing post-implantation diamond but does not teach the temperature in range of 800.degree. C. to less than 1800.degree. C., under high-pressure conditions of 3 GPa or more. However Zaitsev disclosure for given

conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 6, Zaitsev discloses the Semiconductor diamond being n-type, but does not teach incorporating, from a crystal face thereof to the same depth, 10 ppm or more of each of Li and N, and having a sheet resistance is of 10.sup.7 .OMEGA./.quadrature. or less. However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

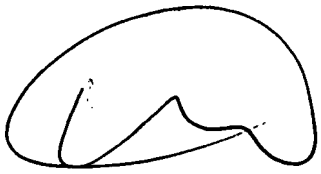
Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ankush k. Singal whose telephone number is 5712701204. The examiner can normally be reached on monday-friday 7am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MATTHEW SMITH can be reached on (571)272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ankush Singal



David Coleman
Primary Examiner